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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|-------------------------|------------------------|
| 10/530,493 | 04/06/2005 | Motokazu Kobayashi | 03500.017633 | 4722 |
| 5514 7590 09/06/2007 FITZPATRICK CELLA HARPER & SCINTO 30 ROCKEFELLER PLAZA NEW YORK, NY 10112 | | | EXAMINER LEWIS, BEN | |
| | | | ART UNIT 1745 | PAPER NUMBER |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | | |
|------------------------------|------------------------|--|---------------------|--|
| Office Action Summary | Application No. | | Applicant(s) | |
| | 10/530,493 | | KOBAYASHI ET AL. | |
| | Examiner | | Art Unit | |
| | Ben Lewis | | 1745 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 14-17 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 14-17 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 April 2005 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____ |

Detailed Action

1. The Applicant's amendment filed on June 15th, 2007 was received. Claims 1-13 were cancelled. Claims 14-17 were added.
2. The text of those sections of Title 35, U.S.C. code not included in this action can be found in the prior Office Action (issued on March 21st, 2007).

Pendency of Claims

Original claims 1-13 were filed in this national stage application. However, applicant cancelled claims 1-13 in the amendment filed on June 15th, 2007 listing claims 1-13 as cancelled and claims 14-17 as new. For the purposes of prosecution, claims 14-17 are treated as amended claims.

Claim Rejections - 35 USC § 112

The claim rejections under 35 U.S.C. 112, second paragraph, on claim 2 is withdrawn, because the claim has been cancelled.

Claim Rejections - 35 USC § 103

3. Claims 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hulett (U.S. Patent No. 6,074,692) and further in view of Hampden-Smith et al. 7,138,354 B2).

With respect to claims 14-17, Hampden-Smith et al. disclose a method for the fabrication of an electrocatalyst layer.

With respect to a solution of conductive particles carrying thereon a catalyst, Hampden-Smith et al. teach that. The improvement in catalytic activity of the electrocatalyst of the present invention when compared to the prior art samples can be explained by the platinum (catalysts) cluster size and its distribution on the carbon (conductive particles) surface. (Col 66 lines 50-67).

With respect to conductive particles, Hampden-Smith et al. teach that in some cases it may be desirable to combine the metal and metal oxide phases into a single layer to take advantage of multiple functions. For example, it may be advantageous to combine the electrocatalyst layer with the current collector layer. In this case an electronically conductive layer containing a metal or metal oxide catalyst is necessary (Col 6 lines 5-20). Hampden-Smith et al. also teach that the electrocatalyst powders of the present invention can be deposited onto device surfaces or substrates by a number of different deposition methods which involve the direct deposition of the dry powder such as dusting, electrophotographic or electrostatic precipitation. Other deposition methods involve liquid vehicles such as ink-jet printing, syringe dispense, toner deposition, slurry deposition, paste-based methods and electrophoresis. In all these deposition methods, the powders according to the present invention have a number of

advantages over the powders produced by other methods. For example, small, spherical, narrow size distribution particles are more easily dispersed in liquid vehicles, they remain dispersed for a longer period of time and allow printing of smoother and finer features compared to powders made by alternative methods (Col 35 lines 45-60). Printing methods "ink-jet" can also facilitate better control over the construction of interfaces and layer compositions giving rise to tailored gradients in composition and layer surface morphology that facilitate chemical transport and electrochemical reactions (Col 38 lines 20-30).

Hampden-Smith et al. teach that each drop generated by the ink-jet head includes approximately 2 to 200 picoliters of the liquid that is delivered to the surface (Col 42 lines 40-50).

With respect to an ink-jet process droplets of a solution containing conductive particles carrying thereon a catalyst such that there are portions where the droplets are isolated and portions where the droplets partly overlap, Hulett as modified by Hampden-Smith et al teach other deposition methods involve liquid vehicles such as ink-jet printing, syringe dispense, toner deposition, slurry deposition, paste-based methods and electrophoresis. In all these deposition methods, the powders according to the present invention have a number of advantages over the powders produced by other methods. For example, small, spherical, narrow size distribution particles are more easily dispersed in liquid vehicles, they remain dispersed for a longer period of time and allow printing of smoother and finer features compared to powders made by alternative methods (Col 35 lines 45-60). Printing methods "ink-jet" can also facilitate better control

over the construction of interfaces and layer compositions giving rise to tailored gradients in composition and layer surface morphology that facilitate chemical transport and electrochemical reactions (Col 38 lines 20-30) (It is noted that for chemical transport to take place the printed layer must be porous).

The instant specification recites that upon ejection of the electrode catalyst composition in pixels in the form of droplets, there come portions where droplets are isolated and portions where droplets overlap partly, so that pores are formed in the electrode catalyst layers after the droplets have been dried (Paragraph 0050).

Hulett as modified by Hampden-Smith et al do not specifically teach that there are portions where the droplets are isolated and portions where the droplets partly overlap. However, it is the position of the examiner that such properties are inherent, given that Hulett as modified by Hampden-Smith et al and the present application utilize the same inkjet printing method for the construction of interfaces and layer compositions giving rise to tailored gradients in composition and layer surface morphology that facilitate chemical transport and electrochemical reactions (Col 38 lines 20-30) (It is noted that for chemical transport to take place the printed layer must be porous).

A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature is necessarily present in that which is described in the reference: In re Robertson, 49 USPQ2d 1949 (1999).

With respect to claims 15 and 17, Hampden-Smith et al. teach that the gas diffusion electrode is prepared by brush application of a suspension of non-porous

acetylene carbon black and Teflon emulsion a carbon cloth (diffusion layer). The gas-diffusion electrode, soaked with the Teflon/carbon suspension, is heat treated (Col 65 lines 45-55).

Response to Arguments

4. Applicant's arguments filed on June 15th, 2007 have been fully considered but they are not persuasive.

Applicant's principal arguments are

(a) As the Examiner acknowledged in the Office Action, Hulett do not disclose or suggest coating using an ink-jet process. While the Examiner cited Hampden-Smith for the use of the ink-jet process, this reference does not disclose or suggest ejecting droplets such that there are portions where the droplets are isolated and portions where the droplets partly overlap, as is presently claimed. Kurzweil was cited for teaching unrelated to ink-jet deposition and lacks the same disclosure regarding the claimed ejection of droplets as Hulett and Hampden-Smith.

In response to Applicant's arguments, please consider the following comments.

(a) With respect to an ink-jet process droplets of a solution containing conductive particles carrying thereon a catalyst such that there are portions where the droplets are isolated and portions where the droplets partly overlap, Hulett as modified by Hampden-Smith et al teach other deposition methods involve liquid vehicles such as ink-jet printing, syringe dispense, toner deposition, slurry deposition, paste-based methods and electrophoresis. In all these deposition methods, the powders according to the present invention have a number of advantages over the powders produced by other methods. For example, small, spherical, narrow size distribution particles are more easily dispersed in liquid vehicles, they remain dispersed for a longer period of time and allow printing of smoother and finer features compared to powders made by alternative methods (Col 35 lines 45-60). Printing methods "ink-jet" can also facilitate better control over the construction of interfaces and layer compositions giving rise to tailored gradients in composition and layer surface morphology that facilitate chemical transport and electrochemical reactions (Col 38 lines 20-30) (It is noted that for chemical transport to take place the printed layer must be porous).

The instant specification recites that upon ejection of the electrode catalyst composition in pixels in the form of droplets, there come portions where droplets are isolated and portions where droplets overlap partly, so that pores are formed in the electrode catalyst layers after the droplets have been dried (Paragraph 0050).

Hulett as modified by Hampden-Smith et al do not specifically teach that there are portions where the droplets are isolated and portions where the droplets partly overlap. However, it is the position of the examiner that such properties are inherent,

given that Hulett as modified by Hampden-Smith et al and the present application utilize the same inkjet printing method for the construction of interfaces and layer compositions giving rise to tailored gradients in composition and layer surface morphology that facilitate chemical transport and electrochemical reactions (Col 38 lines 20-30) (It is noted that for chemical transport to take place the printed layer must be porous).

A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature is necessarily present in that which is described in the reference. In re Robertson, 49 USPQ2d 1949 (1999).

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ben Lewis whose telephone number is 571-272-6481.

The examiner can normally be reached on 8:30am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Ben Lewis

Patent Examiner
Art Unit 1745


PATRICK JOSEPH RYAN
SUPERVISOR, PATENT EXAMINER